

# Grades 6-8

# Key Messages: Grades 6-8 Presentation

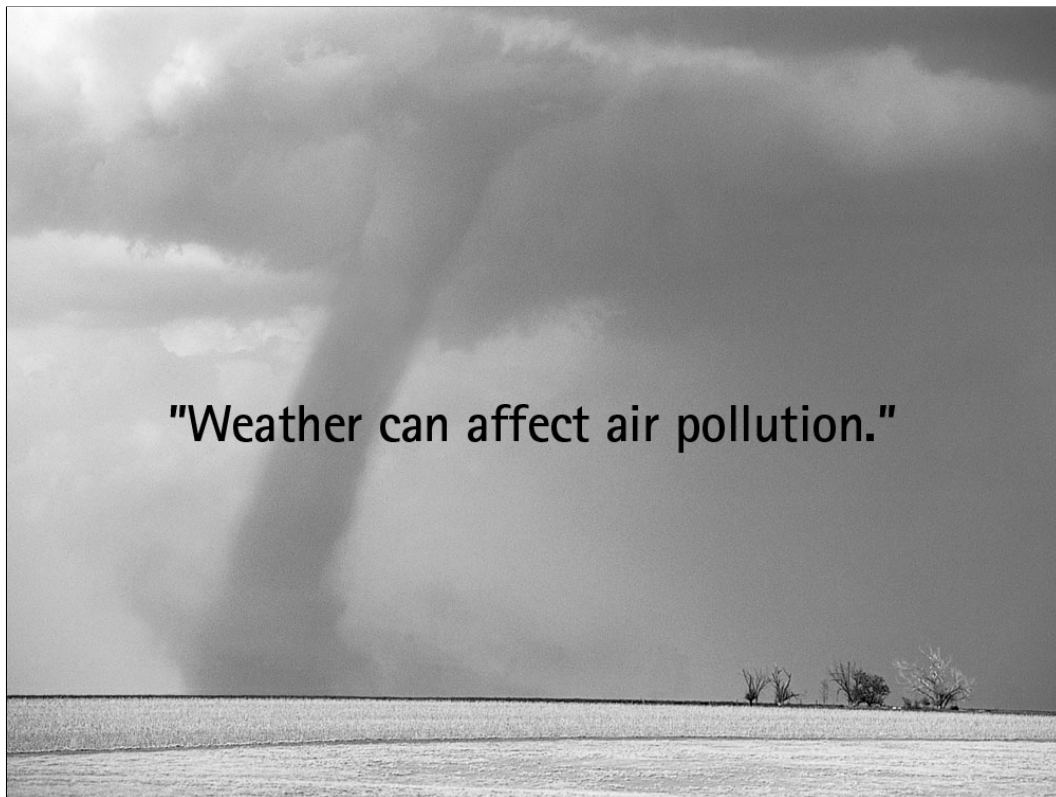


- Breathing polluted air is unhealthy. For example, you might find it more difficult to breathe, you might cough or wheeze, or your chest might feel tight.
- You can't always tell if the air is polluted by how it looks. The Air Quality Index, or AQI, can help.
- Two main types of air pollution are ozone pollution and particle pollution.
- The ozone we breathe at ground level is bad. But very high in the atmosphere is a natural layer of ozone that is good because it protects us from the sun's harmful ultraviolet rays. A rhyme that can help you remember this is: "Ozone: Good up high, bad nearby."
- You can protect your health in three ways when the air is polluted:
  1. Find out the air quality each day.
    - You can do this by checking the AQI (the Air Quality Index), just like checking the weather report. The AQI uses color-coded maps and health messages to tell you how clean or polluted the air is. For example, green means the air is clean. Red means the air is unhealthy for everyone.
    - You can always find the AQI on the Internet at a site called AIRNow at: [www.airnow.gov](http://www.airnow.gov) . You also might hear about the AQI on TV during the weather forecast or on the radio, or you might see it on the weather page in the local newspaper.
  2. If you're outside when you *know* the air is polluted, you can protect your health by taking it easier. It's important to exercise and be active to maintain good health. But when the air is polluted, you can reduce the time you spend exercising, walk instead of run, take frequent breaks, or go outside at another time or on another day when the air is cleaner.
  3. If you notice any symptoms when you're outside like coughing, pain when you take a deep breath, chest tightness, or wheezing, stop your activity and tell an adult. This is especially important if you have asthma.
- Both people's activities (such as transportation, energy use, and materials production) and nature (such as forest fires and volcanic eruptions) can cause air pollution.
- You can help reduce pollution. For example, turn off lights and equipment that use energy when you don't need them. Walk, bike, carpool, or use public transportation when possible instead of having someone drive you.

# **Notes Pages: Grades 6-8**



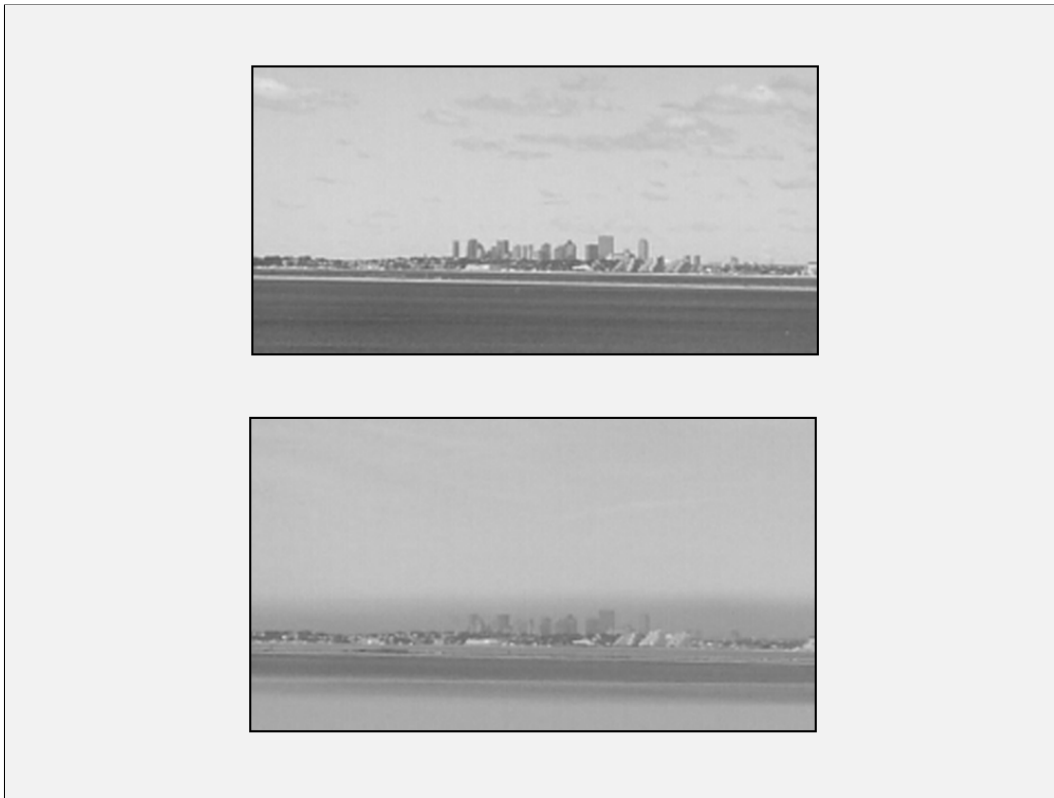
- Now I'd like to talk about how weather relates to air pollution, and how air pollution can affect your health. To do this, I'm going to begin by asking you some true or false questions.
- True or false: Thunderstorms can have an effect on air pollution. *[Correct response: true]*
- True. The fast-moving air during thunderstorms scatters, or disperses, pollutants, and the rain cleanses the air.



- True or false: Other types of weather can also have an affect on air pollution. *[Correct response: true]*
- True. Wind can affect air pollution. Wind can move air pollution to different places, sometimes hundreds of miles away.
- What other kinds of weather conditions do you think can affect air pollution? *[You may want to wait for a few responses]*
- High pressure, stagnant conditions, clear skies/sunlight, and warm temperatures can all affect air pollution.
- For example, in a high pressure system, the air typically moves very little, with only occasional light breezes – it's stagnant – which keeps pollutants where they are.
- Another example - On clear days, sunlight and warm temperatures can “bake” certain chemicals, causing them to react and form ozone, one type of air pollutant.

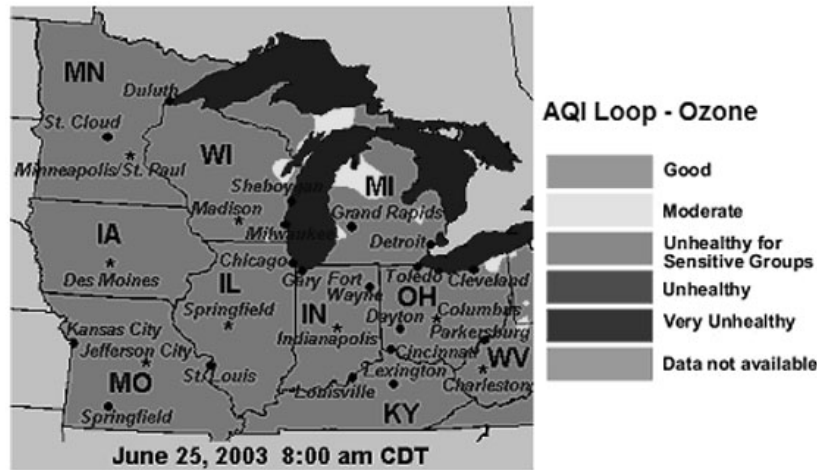


- There are many sources of air pollution, such as cars, factories, power plants that produce electricity, some ordinary products like house paints, and many other things.
- Sometimes nature can pollute the air. The bottom two photos show a forest fire and a volcano, both of which can pollute the air.
- If you lived near a forest fire, what do you think it would feel like to breathe the air that day? *[Wait for an answer or two.]*
- The air would be very smoky, and it might make you cough, or irritate your eyes, or you might find it harder to breathe.
- Forest fires and volcanoes put small particles into the air. Particle pollution is one type of air pollution that can come from both natural sources like these and from people's activities.



- Here's another type of pollution. The top picture shows Boston when the air is clean. The bottom picture shows Boston when the air is polluted with something called "smog."
- Smog is a combination of pollutants, two of which we've mentioned: ozone and particles. Both of these pollutants can affect our health.
- Here's another true or false question: Sometimes ozone in the air is a good thing.  
*[Correct response: true]*
- True. Ozone in the air we breathe here at ground level is bad. But very high up in the atmosphere (in the stratosphere, which extends up from about 6 to 30 miles), there's a natural layer of ozone that protects us from getting too much radiation from the sun.
- Here's another question—true or false: You can always tell when the air is polluted by how it looks. *[Correct response: false]*
- False. Polluted air often does look dirty. But sometimes air that looks clean might in fact be polluted.
- You can check the air quality each day by looking at color-coded maps and health messages, like the map on the next slide.

### Midwest Ozone Maps for June 25, 2003

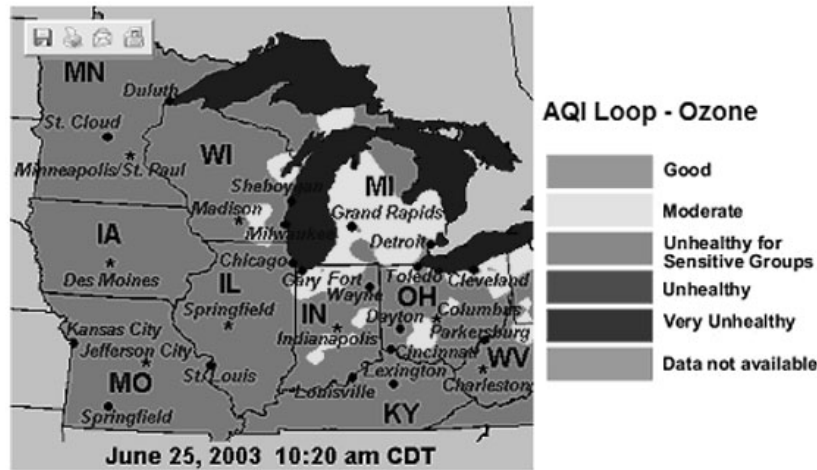


[www.airnow.gov](http://www.airnow.gov)

- This ozone map comes from an Internet website called AIRNow where you can check daily air quality for many different locations. This particular map shows the air quality and related health messages for several Midwestern states at 8:00 a.m. on June 25, 2003.
- The color scale to the right of the map is called the Air Quality Index, or AQI, which is a way to report daily air quality. The AQI colors tell us how clean or polluted the air is.
- What is this map telling us about the air quality in the Midwest on this day at 8:00 a.m.? *[Wait for a response]*
- The map is mostly green, so the air quality is mostly “good” for ozone pollution at this location at this time.
- Let’s go forward in time on that same day and see whether the air quality has changed.



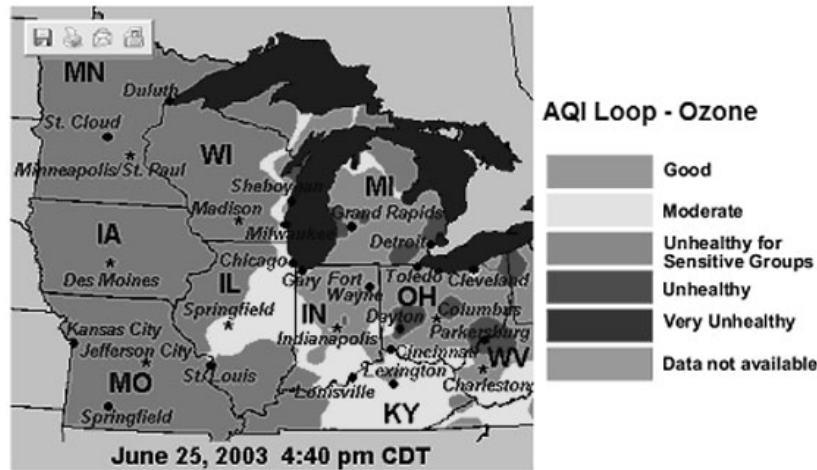
### Midwest Ozone Maps for June 25, 2003



[www.airnow.gov](http://www.airnow.gov)

- Now it's 10:20 a.m. on the same day. What's happening to the air quality in this area? [Point to yellow area] [Correct response: It's getting worse.]
- The color is yellow, so the AQI is telling us that the air quality is "moderate," which means just a little polluted.
- The health message that goes along with the yellow AQI color is: "Unusually sensitive people should consider reducing prolonged or heavy exertion outdoors."

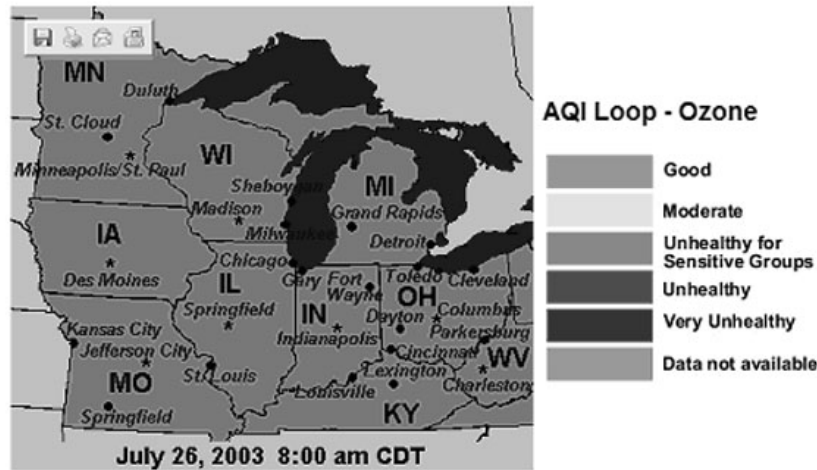
### Midwest Ozone Maps for June 25, 2003



[www.airnow.gov](http://www.airnow.gov)

- Now it's 4:40 p.m. on the same day. What is the air quality in these parts of the Midwest? *[Point to an orange area, then a red area.]*  
*[Correct response: "Unhealthy for sensitive groups" (orange), and "Unhealthy" for everyone (red)]*
- It's "unhealthy for sensitive groups" (for orange) and generally "unhealthy" for everyone (for red).
- "Sensitive groups" are people who are more likely to be affected by air pollution, which includes children, because you are still growing and your lungs are still developing.
- For ozone, sensitive groups include people with lung diseases (including asthma), and active adults and children.
- For particle pollution, sensitive groups include people with heart or lung disease (including asthma), older adults, and children.
- When the AQI is orange, the health message is that sensitive groups should reduce prolonged or heavy exertion outdoors. When the AQI is red, the air is unhealthy for everyone; all people should reduce such activities.

### Midwest Ozone Maps for July 26, 2003



[www.airnow.gov](http://www.airnow.gov)

- Now it's 8:00 a.m. the next day. The map is again green, showing us that the air quality is much better.
- The pattern we saw in the Midwest maps is very typical for ozone pollution: Ozone is often worse in the summer, and worse in the mid-afternoon to early evening, because sunlight and higher temperatures “bake” the pollution from sources such as car exhaust, gasoline vapors, factory emissions, and chemical solvents, and form ozone.
- Increased traffic in the afternoons and evenings during rush-hour also can contribute to higher ozone levels – more pollution from more cars on the road can create more ozone.

# Things You Can Do

## 1. Check the air quality.

- There are several things you can do to protect your health.
- First, you can check whether the air is polluted each day. You can check out the AQI daily on the Internet at the AIRNow website. Also many newspapers and TV and radio weather forecasts include air quality reports.
- If you find out that the air is polluted, here are some things you can do.

# Things You Can Do

1. Check the air quality.
2. Take it easier if you're outside when the air is polluted.

- Exercise is important to staying healthy, so it's good to be outside. But when the air is polluted, take it easier when you're outside. That might mean not running around as much as you normally would, or for as long a time. Or take frequent breaks, or plan to be outside at another time or on another day when the air is cleaner.
- Let's think about why this makes sense. Do you breathe more when you're active, or when you're taking it easier?  
*[Correct response: when active]*
- We breathe harder when we're active, which means we can breathe in more dirty air if the air is polluted.
- Here's another thing you can do.

# Things You Can Do

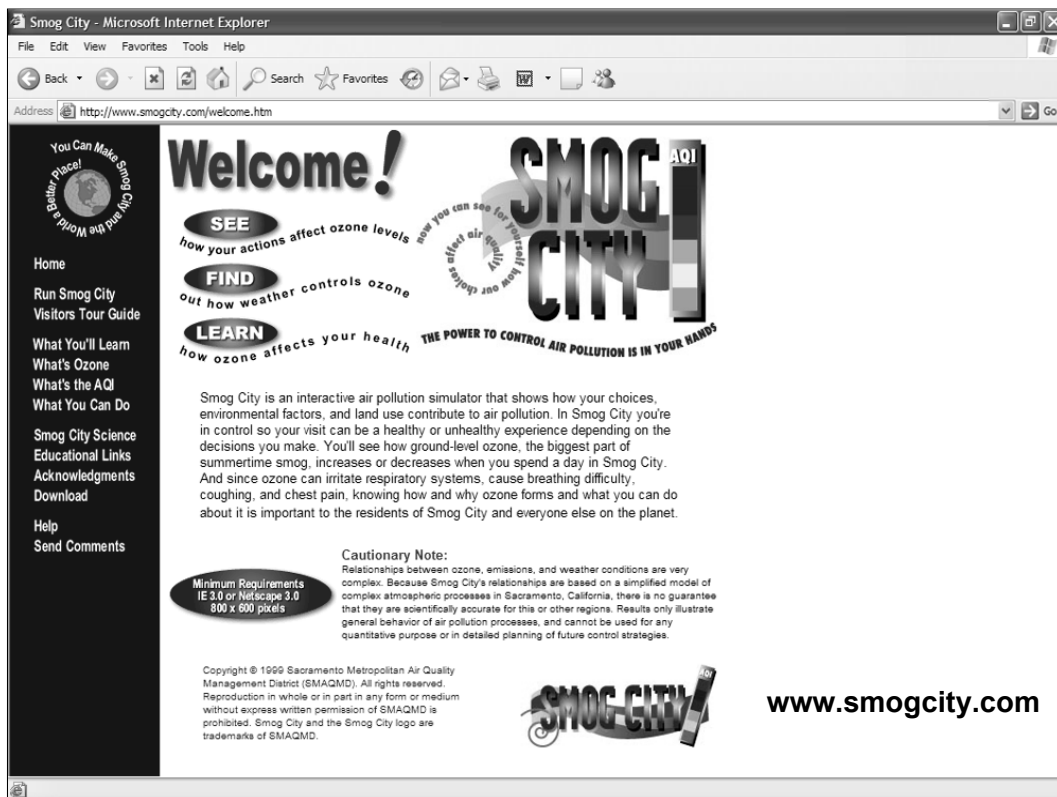
1. Check the air quality.
2. Take it easier if you're outside when the air is polluted.
3. If breathing feels different when the air is polluted, tell an adult.

- If the air is polluted and you notice any symptoms like unusual coughing, or pain when you take a deep breath, or chest tightness, or wheezing, stop your activity and tell an adult.
- This is especially important if you have asthma, because air pollution can aggravate asthma.

# Things You Can Do

1. Check the air quality.
2. Take it easier if you're outside when the air is polluted.
3. If breathing feels different when the air is polluted, tell an adult.
4. Help reduce pollution.

- There are also things you can do to reduce air pollution, such as turning off lights and equipment that use energy when you don't need them. Cutting back on electricity helps power plants cut back their pollution.
- Also, instead of having your parents drive you all over the place - walk, bike, carpool, or take the bus, train, or subway if you can when the air quality is good. But remember, your safety always comes first!



- Here's a cool website called Smog City where you can learn more about how people and weather affect air pollution.

### *Pass out handout*

- This handout tells you how you can visit Smog City on the Internet and how you can get to the AIRNow website to check air quality.
- It also reminds you about what you can do to protect your health when the air is polluted.

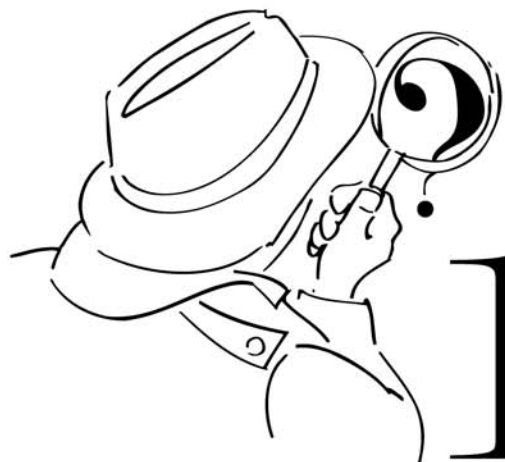


# **Student Handout:**

## **Grades 6-8**

# Be Air Quality Smart!

## Four Things You Can Do



# 1

### Check the Air Quality Index.

- Visit the AIRNow web site at [www.airnow.gov](http://www.airnow.gov).
- Listen for air quality information on the radio or TV.

# 2

### Protect your health when the air is polluted.

- Take it easier when you're outside.
- If it feels harder to breathe, tell an adult.



# 3

### Help reduce pollution.

- Turn off lights and equipment.
- Walk, bike, carpool, or take the bus when the air quality is good. But remember, your safety always comes first!

# 4

Have fun at the Smog City web site:  
[www.smogcity.com](http://www.smogcity.com)



# **Optional Additional Activity for Grades 6-8: *Smog City***

## **Optional Additional Activity for Grades 6-8: *Smog City* For Weathercaster Presentations Using the CD**

The *Smog City* software program is on the CD-ROM included as part of this Toolkit. If you have a few extra minutes with the Grades 6-8 students after your presentation, you may want to explore *Smog City* with them (this activity will take about 5 minutes). *Smog City* can be a great tool to help make the connection between weather and air pollution.

*Tips for Using Smog City with Students:*

Access the *Smog City* program on the CD-ROM included in your Toolkit.

To start the program:

- Click on “Run Smog City” on the left side of the toolbar, and project it on your presentation screen.
- Tell the students that several things in the picture can affect whether or not smog occurs. Point to each item with your cursor as you mention it:

*Weather conditions* (moving from left to right on the *Smog City* home page):

- Temperature
- Whether there is an inversion layer (you probably will want to explain to them what an inversion layer is)
- Wind speed
- Whether it’s a sunny or cloudy day

*Population level*

*Emissions levels* - from:

- Cars and trucks
  - Off-road vehicles such as construction equipment, boats, jet skis, and snowmobiles
  - Factories
  - Consumer products - like cleaners, paints, and yard chemicals
- Ask the class to select levels for each of the above items.
  - Then click on the “Start” button.
  - Ask the class: What “ozone level” (green, yellow, orange, red) did these settings result in? (See display.)
  - Also ask the class: Are there any “Health Effects” associated with this ozone level? (See display.)

- Next, make a dramatic change in the “sun vs. cloudy weather” setting only, and ask the students what impact they expect this will have on the ozone levels. Then press “Start” and ask them to observe and comment whether their hypothesis was correct.
- If time allows, continue this activity by changing one setting at a time, asking students for a hypothesis, and then checking what happens when you press “Start.” (Note: You will need to press “Reset” before making each change.)
- Mention that the URL for *Smog City* is on the handout and encourage students to continue exploring the relationships between weather, human activities, and ozone pollution by visiting the website.

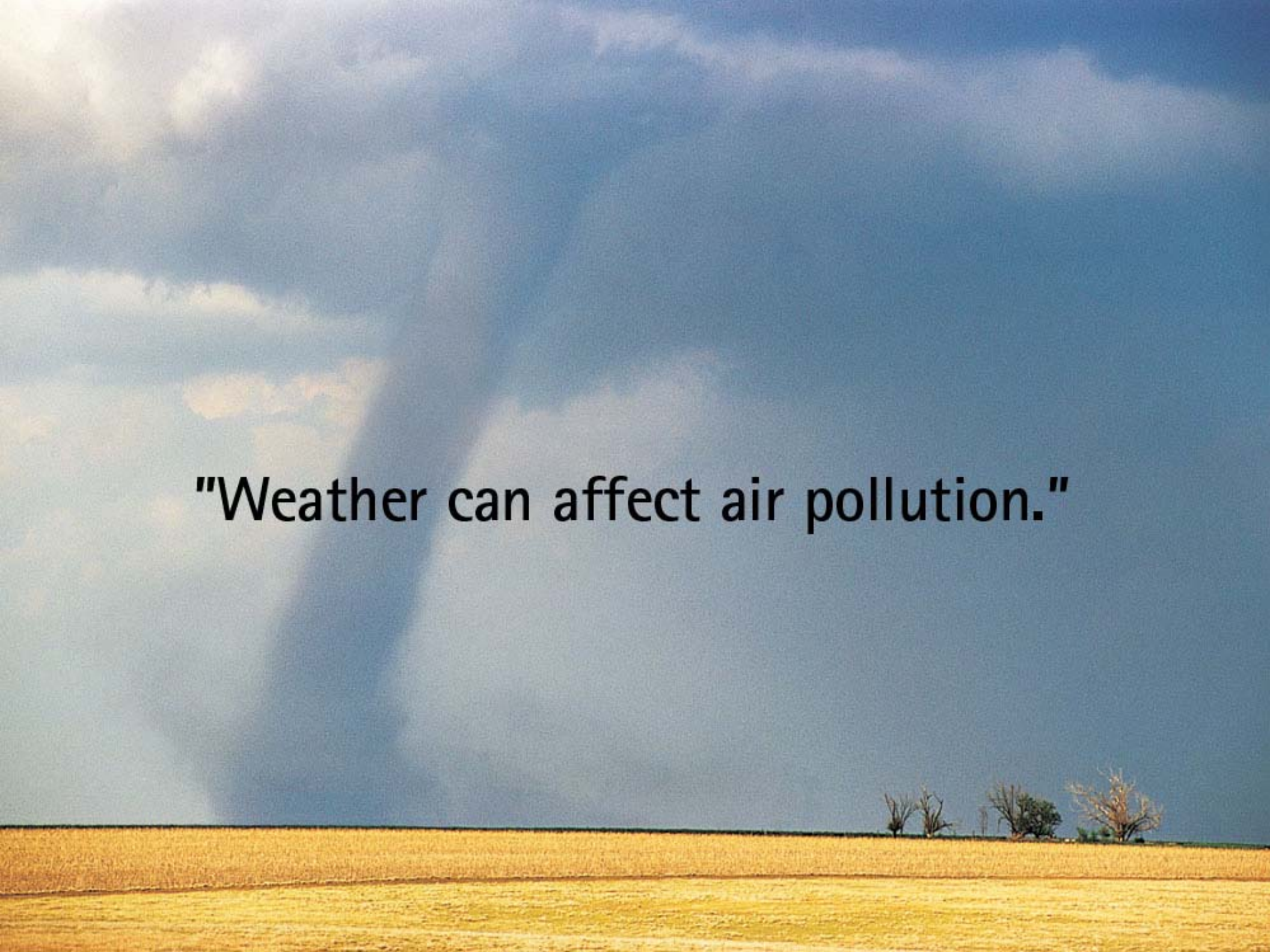
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# **Transparencies: Grades 6-8**



**What  
Color Is  
Your Air  
Today?**



A landscape photograph featuring a vibrant rainbow arching across a deep blue sky. The foreground is a flat, golden-yellow field, likely a harvested crop field. On the right side of the horizon, there are a few small, dark trees. The overall scene is dramatic and visually striking.

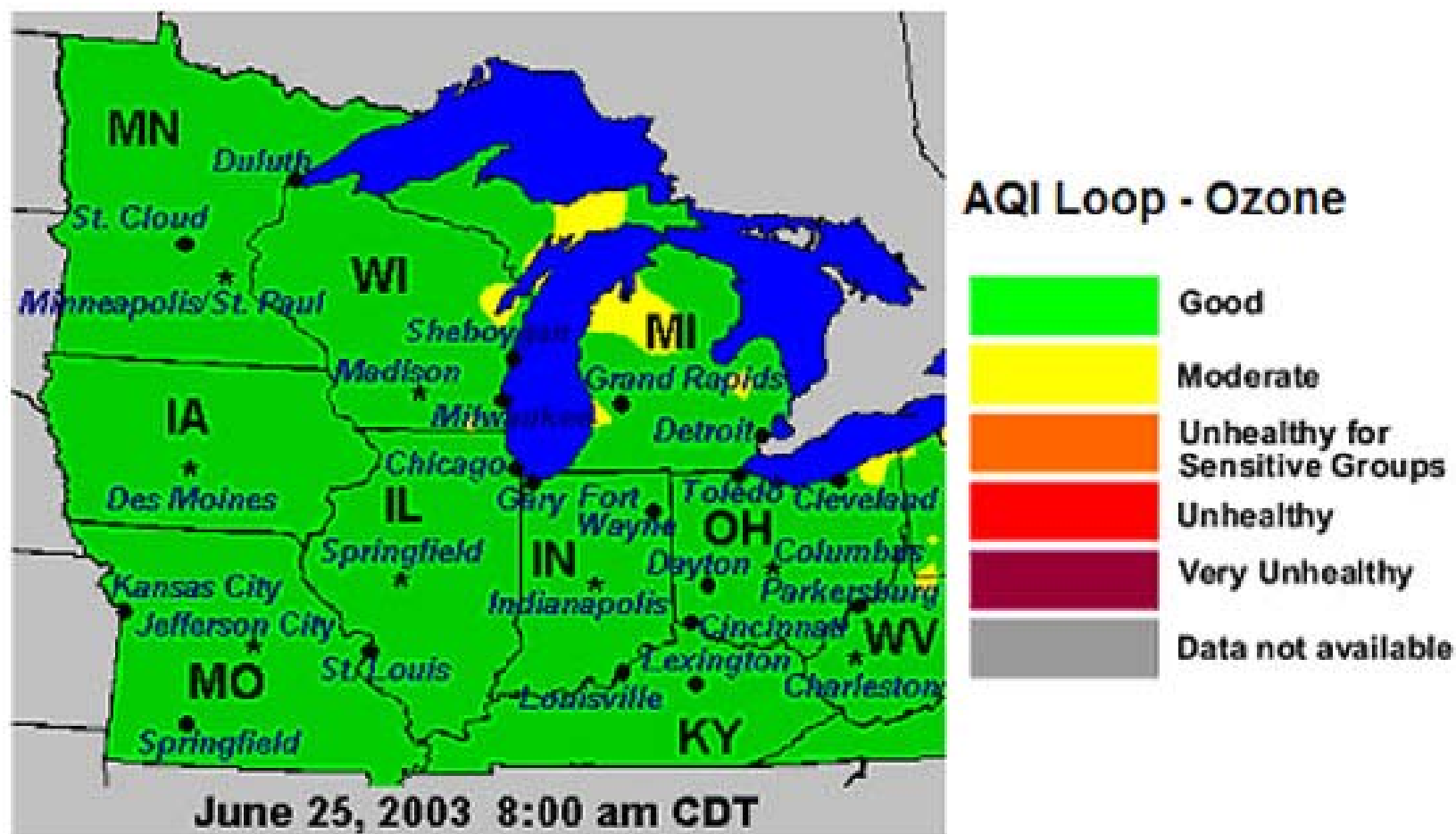
"Weather can affect air pollution."





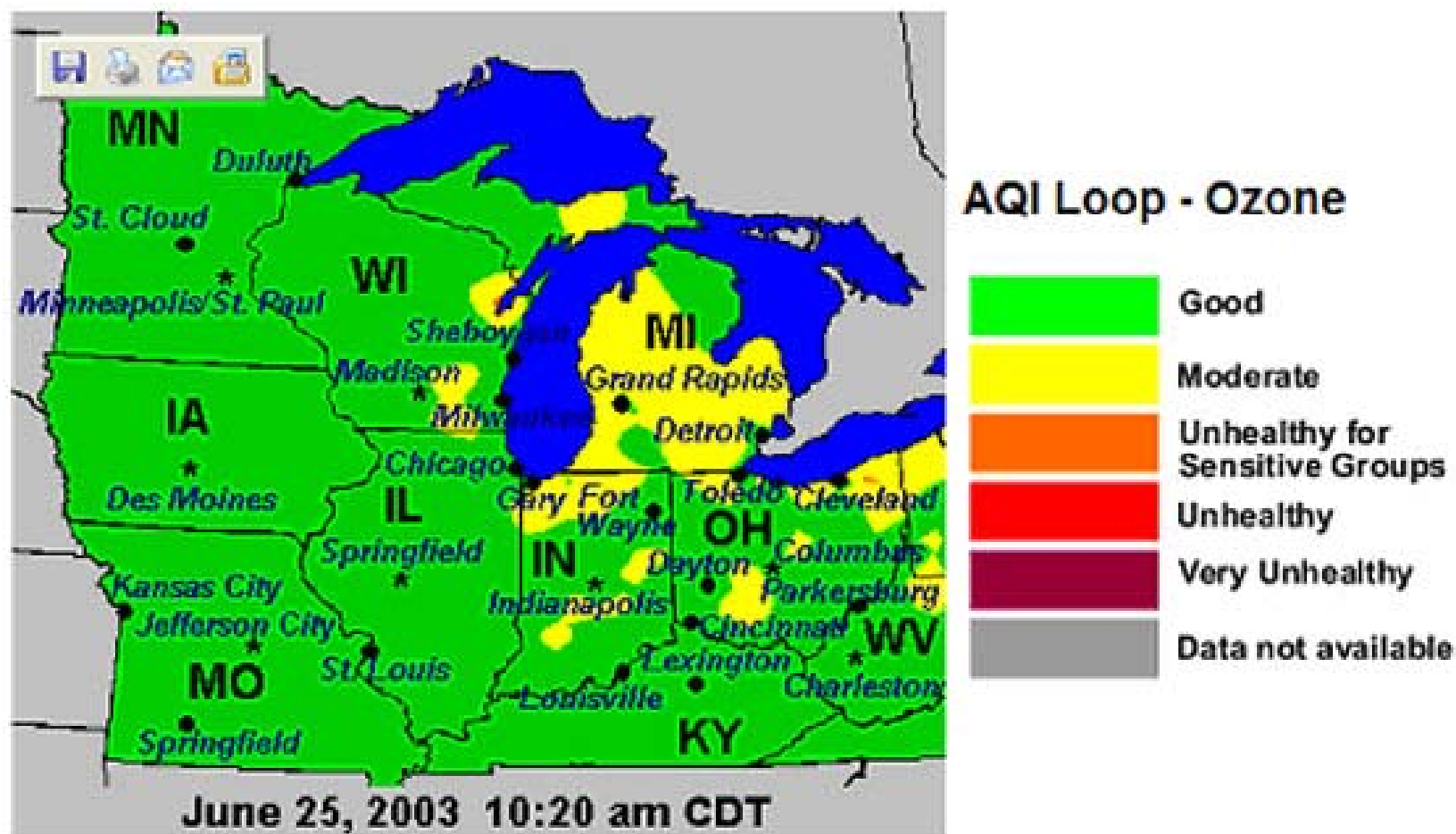


## Midwest Ozone Maps for June 25, 2003



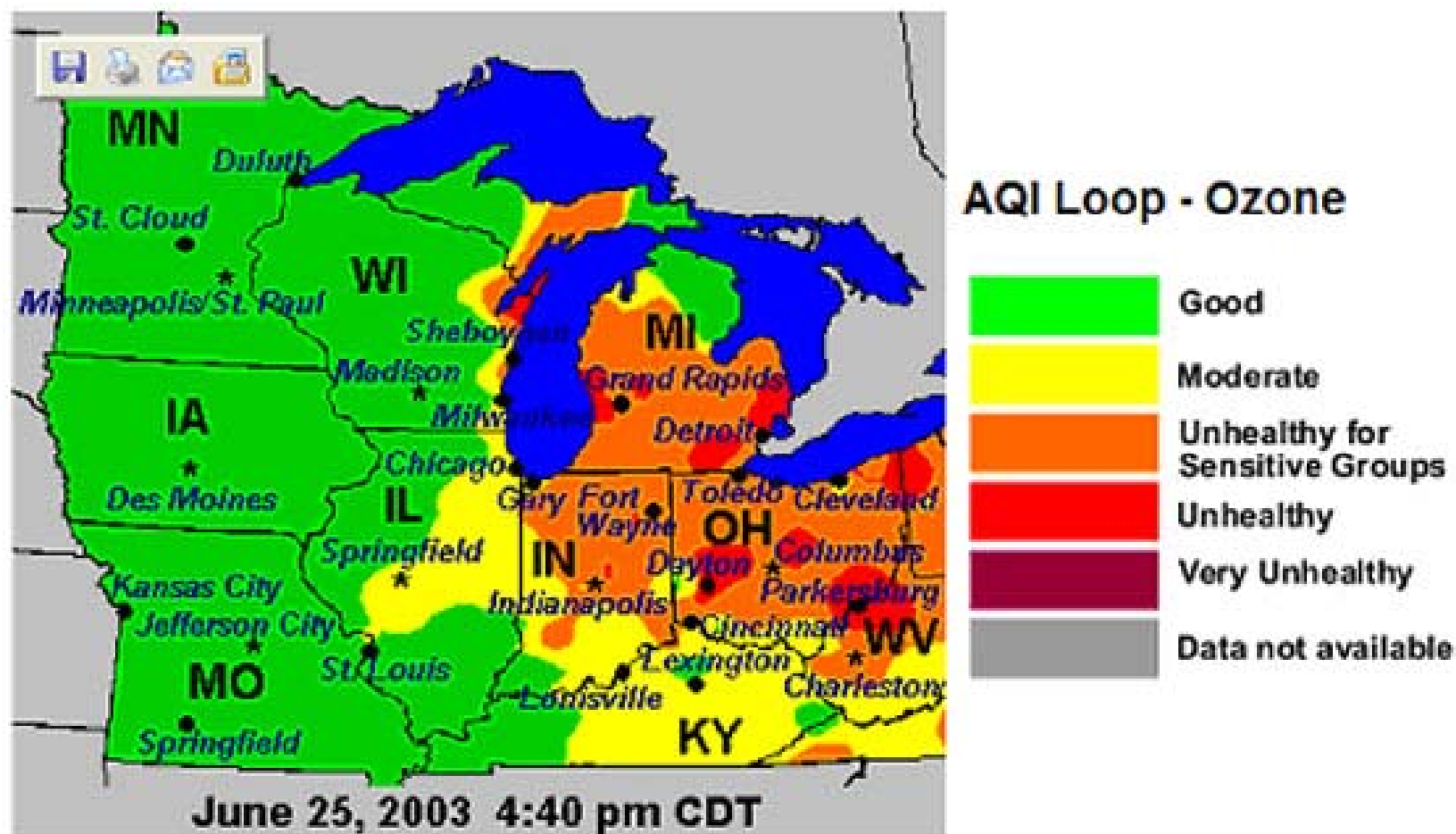
[www.airnow.gov](http://www.airnow.gov)

## Midwest Ozone Maps for June 25, 2003



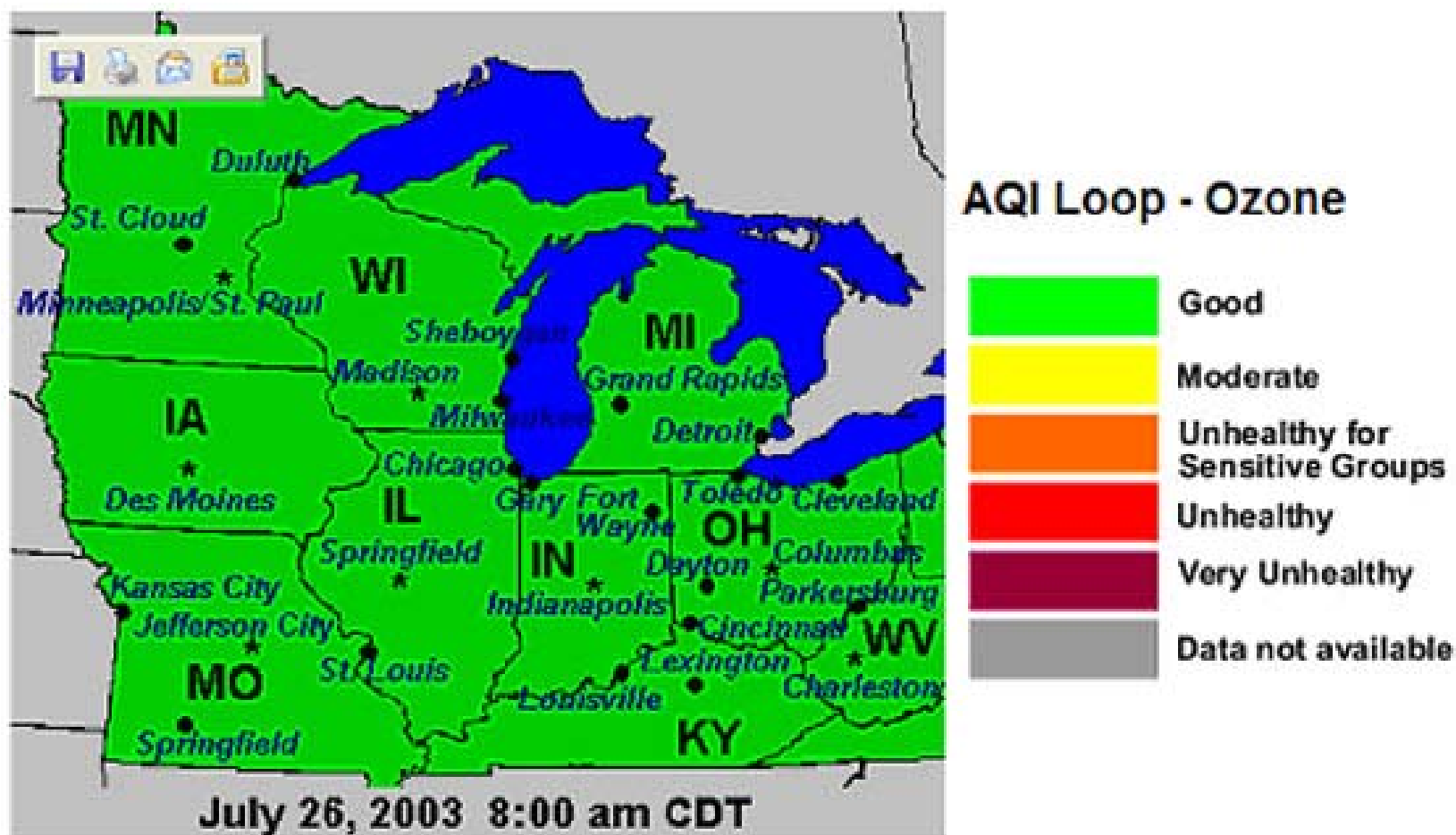
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## Midwest Ozone Maps for June 25, 2003



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## Midwest Ozone Maps for July 26, 2003



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# Things You Can Do

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# **Things You Can Do**

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# **Things You Can Do**

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- 4. Help reduce pollution.**



[Home](#)[Run Smog City](#)  
[Visitors Tour Guide](#)[What You'll Learn](#)  
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[What You Can Do](#)[Smog City Science](#)  
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# Welcome!

**SEE**  
how your actions affect ozone levels

**FIND**  
out how weather controls ozone

**LEARN**  
how ozone affects your health



THE POWER TO CONTROL AIR POLLUTION IS IN YOUR HANDS

Smog City is an interactive air pollution simulator that shows how your choices, environmental factors, and land use contribute to air pollution. In Smog City you're in control so your visit can be a healthy or unhealthy experience depending on the decisions you make. You'll see how ground-level ozone, the biggest part of summertime smog, increases or decreases when you spend a day in Smog City. And since ozone can irritate respiratory systems, cause breathing difficulty, coughing, and chest pain, knowing how and why ozone forms and what you can do about it is important to the residents of Smog City and everyone else on the planet.

**Minimum Requirements**  
IE 3.0 or Netscape 3.0  
800 x 600 pixels

### Cautionary Note:

Relationships between ozone, emissions, and weather conditions are very complex. Because Smog City's relationships are based on a simplified model of complex atmospheric processes in Sacramento, California, there is no guarantee that they are scientifically accurate for this or other regions. Results only illustrate general behavior of air pollution processes, and cannot be used for any quantitative purpose or in detailed planning of future control strategies.

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